Demonstrating Contextual Group Recommendations for Media in a Home Environment

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ABSTRACT
Handling information overload is a non-trivial challenge, especially in a home environment that consists of multiple storage devices used by multiple family members. In this paper we describe a demo that uses a group recommendation strategy to adapt dynamically to changing contexts. The system allows at-runtime tweaking of recommendation results and is architecturally designed to meet hardware requirements imposed by in-home devices.

Categories and Subject Descriptors
H.4. [**Information Systems**]: Information systems applications – *Miscellaneous.*

General Terms
Algorithms, Design, Human Factors.

Keywords
Recommendations, User Interface, Home.

1. INTRODUCTION
The home environment is from an information system's point of view typically an environment that can be characterized as being an interconnected network of multiple devices, used by several family members. If we want to address the information overload problem for this setting, we need to take into account the fact that content is often consumed in group and in rapidly changing contexts. In this document we describe the setup of a demo showing how a group recommendation approach can be applied in the home environment to meet these needs.

2. SYSTEM ARCHITECTURE
Calculating recommendations is a process that requires a considerable amount of computing power. Since typically no device in a home environment is up for this task, the recommendation calculation process is offloaded to a server outside the home network. This has the additional advantage of always up-to-date algorithms and the potential of using data across different households to improve the final recommendation quality.

Therefore our system architecture consists of an external server that connects to an internal component in the home network. This internal component implements the synchronization of data with the external server and provides the user interface to the system. Through this user interface feedback can be collected about user behavior, preferences and context all of which serve as input to the recommendation process.

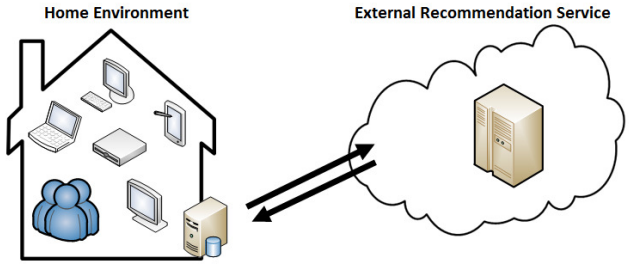

Figure 1: The conceptual system architecture. The home environment synchronizes data with an external server to send feedback and receive recommendations.

3. GROUP RECOMMENDATIONS
Recommending items for an individual and recommending for a group are two completely different paradigms. Although it may seem straightforward to perform some kind of aggregation and be done with it, it is actually not. A lot of different strategies can be applied and many of them have been the topic of research papers [1].

The central focus of a group recommendation algorithm is usually the aggregation method, i.e. the way individual data is grouped. Depending on the applied strategy this aggregation method may aggregate the ratings of different users into one group rating or be used for example to combine multiple individual recommendation lists into one group recommendation list. No consensus exists about which strategy yields the best result in any given situation, some even claim that the choice of the aggregation method does not really matter [2].

For our group recommendation system multiple state-of-the-art aggregation methods were implemented together with a smart contextual switching strategy.

4. DEMO SETUP
In this demo we want to illustrate the group recommendation system in respect to contextual adaptation. More specifically, users will be able to change the context as they see fit and experience the resulting change in their recommendation lists.

The user interface [3] provides the option of adding new users to the system. Every user can then be set to active or non-active in

Figure 2: The user interface of the system displaying the recommendation list. The list will dynamically update depending on provided feedback and context settings.

the current context. The recommendation list as displayed in the user interface (Figure 2) will change accordingly.

Once a user has been marked as active, content becomes available for that user to provide feedback on. Feedback can be provided in a number of ways including ratings and dialog boxes about general item attributes (Figure 3).

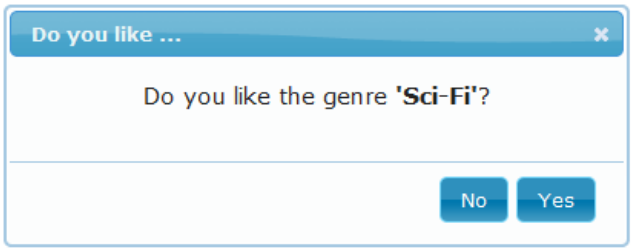

Figure 3: Dialog box allowing users to provide general preferences towards an item attribute (here: 'movie genre').

For registered users a number of controls are available to influence the final recommendations. Each user has an associated weight indicating the virtual importance of that user in the current context (Figure 4). The group recommendation algorithm will take the individual weights of users marked as active into account while calculating the recommendations.

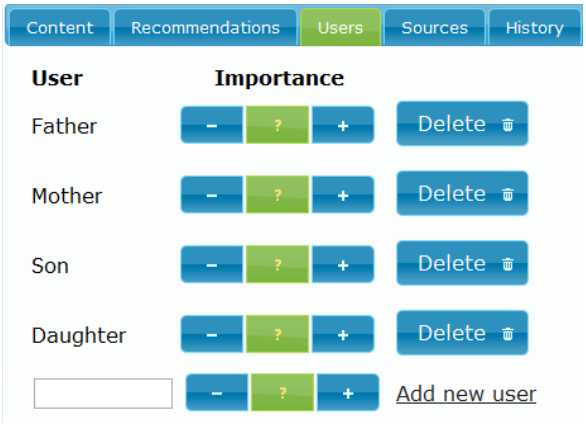

Figure 4: The user settings page in which the individual contextual importance weights of users can be set.

5. CONCLUSIONS

In this demo we have presented a group recommendation system that is capable of quickly adjusting to changing contexts. By means of a user interface, users are able to provide feedback and tweak settings that will have an immediate effect on their recommendation list. By offloading the actual recommendation calculation task to an external server, this system can be integrated with commodity hardware making it very suitable for application in a home environment.

6. ACKNOWLEDGMENTS

This work was supported by the IBBT/OMUS project. Our thanks go out to the colleagues of the IBCN research group who helped developing and supporting this project.

7. REFERENCES

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[2] Linas Baltrunas, Tadas Makcinskas, and Francesco Ricci. 2010. Group recommendations with rank aggregation and collaborative filtering. *In Proceedings of the fourth ACM conference on Recommender systems (RecSys '10).* ACM, New York, NY, USA, 119-126. DOI= http://doi.acm.org/10.1145/1864708.1864733

[3] The user interface of the demo, available at: http://wicaweb4.intec.ugent.be/omus